12-1948

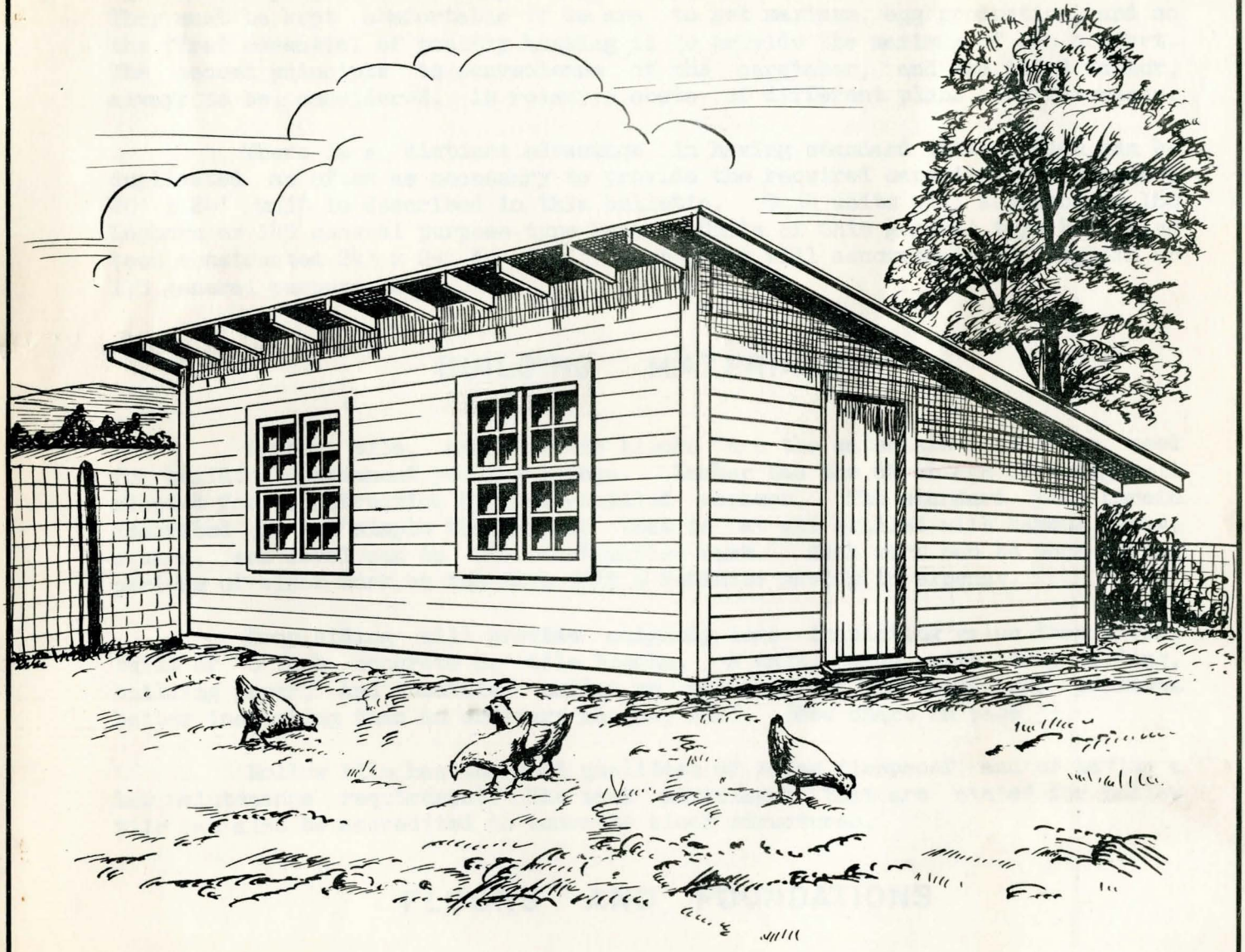
EC1419 Revised 1948 Standard Poultry Laying House

F. E. Mussehl

E. A. Olson

E. C. 1419 DEC. 1948

STANDARD
POULTRY LAYING HOUSE



EXTENSION SERVICE
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE
AND U. S. DEPARTMENT OF AGRICULTURE
COOPERATING
W. V. LAMBERT, DIRECTOR

A STANDARD
POULTRY LAYING HOUSE

By F. E. Mussehl and E. A. Olson*

Laying hens are especially responsive to environmental influences. They must be kept comfortable if we are to get maximum egg production, and so the first essential of poultry housing is to provide the maximum of hen comfort. The second principle is convenience of the caretaker, and the third factor, always to be considered, is relative costs of different plans and materials.

There is a distinct advantage in having standard units which can be duplicated as often as necessary to provide the required capacity. A standard 20' x 24' unit is described in this bulletin. Such units will accommodate 160 Leghorn or 145 general purpose type hens. Units of this general type have also been constructed 24' x 24' in size. Such units will accommodate 200 Leghorn or 175 general purpose hens.

BUILDING MATERIALS

Lumber, tile, and concrete blocks are the materials most often used for building permanent poultry houses. Lumber has the advantage of being well adapted for construction by semi-skilled workers. The standard plan herein described is so simple that anyone that is at all skilled with hammer, saw, square, and level can do the construction work. Such work can be done during periods of slack work on the farm with a definite saving in expense.

Drop siding will provide slightly less insulating value than a wall built of 8 inch concrete or tile blocks. A wall, made with drop siding, building paper, and sheathing nailed on one side of the studding, provides better insulating than an ordinary masonry wall. (See chart on page 3).

Hollow tile has the good qualities of being fireproof and of having a low maintenance requirement. The same advantages that are stated for hollow tile can also be accredited to concrete block structures.

FLOORS AND FOUNDATIONS

Concrete foundations, extending at least 24 inches below the ground level, are recommended to prevent rats and other rodents from burrowing under the floor. Foundations which are six inches wide will be satisfactory.

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Concrete floors have proved generally satisfactory for poultry houses, but recent experiments indicate that much less material needs to be used for floor construction than was formerly thought necessary. A one to five cement-gravel mixture, laid just the thickness of a common 2 x 4 laid flatwise, will be heavy enough for all practical purposes. An experimental slab of cement floor, just the thickness of a one inch board, has been in use for several years at the U. of N. Poultry Farm with good results up to the present time. The advantage of having less material in the floor is that the cost is reduced, and, furthermore, the floor can be kept drier during the winter months because there is less bulk of cold concrete on which moisture will condense when air temperatures change suddenly. Much of the moisture in the litter during the winter months is due to this condensation and not to capillary action from underneath, as was once thought to be the case.

It has been found that a slope of five inches in 20 feet (the depth of the house) toward the front is very desirable in floor construction in order to keep the litter more evenly distributed near the front where the feeding and watering equipment will naturally be located. Further details are shown on pages 4 and 7.

ROOF CONSTRUCTION

Shed type roofs are easy to build, and are practical for units with a depth no greater than 24 feet. Roof rafters should be placed 24 inches apart, and roof boards should be tight so that when windows and doors are open at certain seasons of the year, wind cannot blow through the roof from underneath, loosening the roofing paper at the points at which it is nailed. Some economy in roof construction can be effected by using one ply roofing paper, stripped with one inch metal strips every 18 inches. If the entire roof is then treated with asphalt emulsion and sprinkled with sand, the building will have many of the qualities of a good, durable, built-up roof at relatively low cost. For best results, at least three coats of asphalt roof coating should be applied when the built-up principle is used.

Shingles can also be used, but for best results, the roof should have a slope of at least 1/4 pitch. The gable roof, shown on page 7, is covered with shingles.

TEMPERATURE PROTECTION

Observations at the University Poultry Farm indicate that a tight, single board wall poultry house, without additional insulation, will provide about 12 degrees of temperature differential on an average, quiet, winter day with zero outside temperatures. If this same house is lined with shiplap or car siding and the four inch space between the studs and ceiling rafter is filled with shavings, crushed corncobs, or similar insulation material, an additional 20 degrees of temperature protection can be provided. With climatic conditions such as prevail over most of Nebraska, it is still a question whether or not the extra investment required by insulation is economical, but, surely, one can reason that insulation should be used before we consider artificial heat. The temperature protection provided by insulation is, of course, provided year after year with much less attention than would be necessary with any artificial heating system.

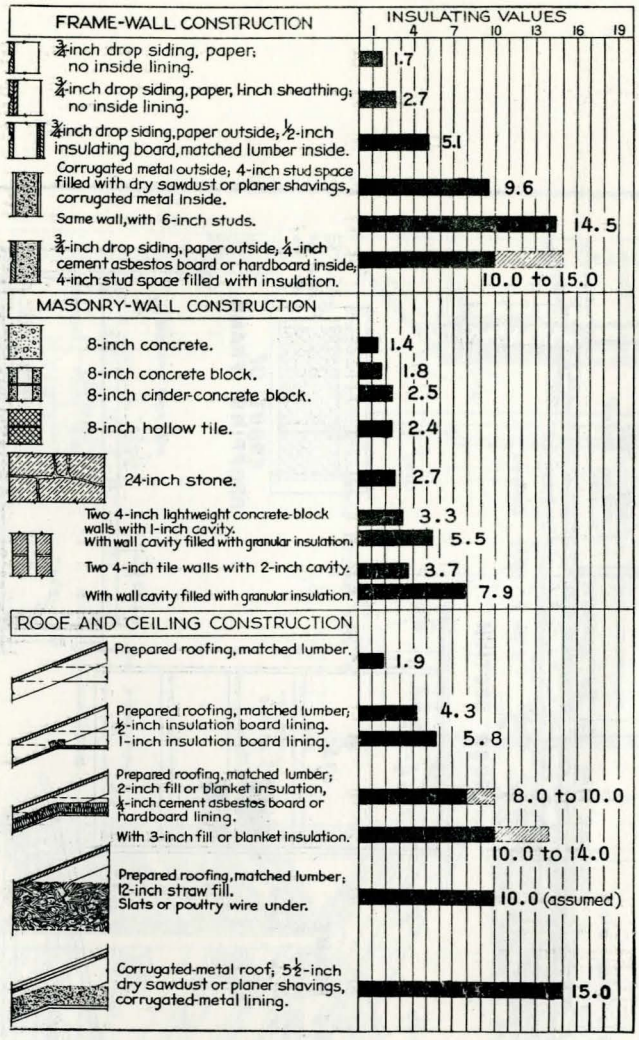
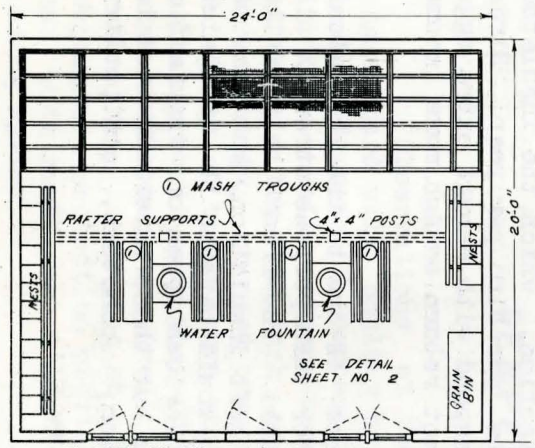


Figure No. 1. Relative Insulating Values of Different Types of Wall and Roof Construction

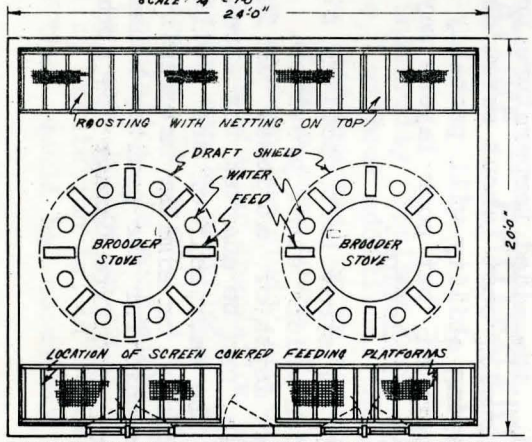
Figure I, reproduced from United States Department of Agriculture Circular No. 738, indicates the relative insulating values of different types of wall and roof construction. If the additional cost of insulation is distributed over a ten-year period, the added temperature protection, which the insulated house provides, will usually cost about seven cents per bird per year. Birds with inherently good laying ability will probably respond with enough extra eggs to pay for the extra overhead, but poor layers may not return enough more income to pay the added cost of insulation.

The popularity of straw loft poultry houses is due to the economical and effective insulation which straw provides. For this purpose straw should cover the ceiling to a depth of at least 12 inches. The front half of the standard shed roof house can be adapted for straw loft insulation, but because of the lack of room, the back half of the ceiling would have to be insulated with shiplap, car siding, or similar material. Various types of insulation boards have been recommended for the poultry houses, but these materials must be protected from moisture and from damage by abrasion, puncture, and poultry packing.



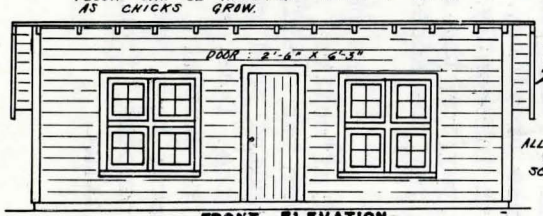
FLOOR PLAN (ARRANGEMENT FOR LAYING HENS)

SCALE: 1/4" = 1'0"

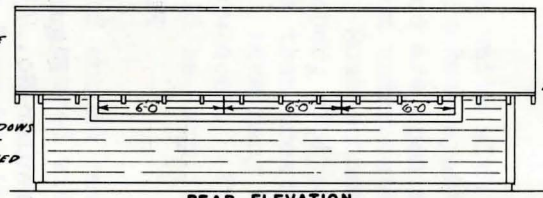


FLOOR PLAN (FOR BROODING 800 CHICKS WITH 2 STOVES IN A 20' X 24' POULTRY HOUSE)

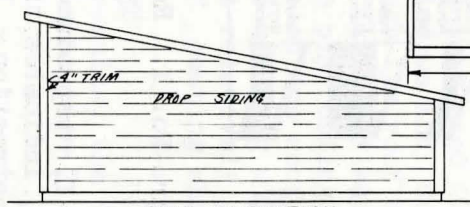
NOTE: ROOSTING FRAMES MAY BE USED FOR HOLDING FEED TROUGHS AND WATERERS AFTER REMOVAL OF DRAFT SHIELDS. DISTANCE FROM FLOOR CAN BE INCREASED FROM 4" TO 20" AS CHICKS GROW.



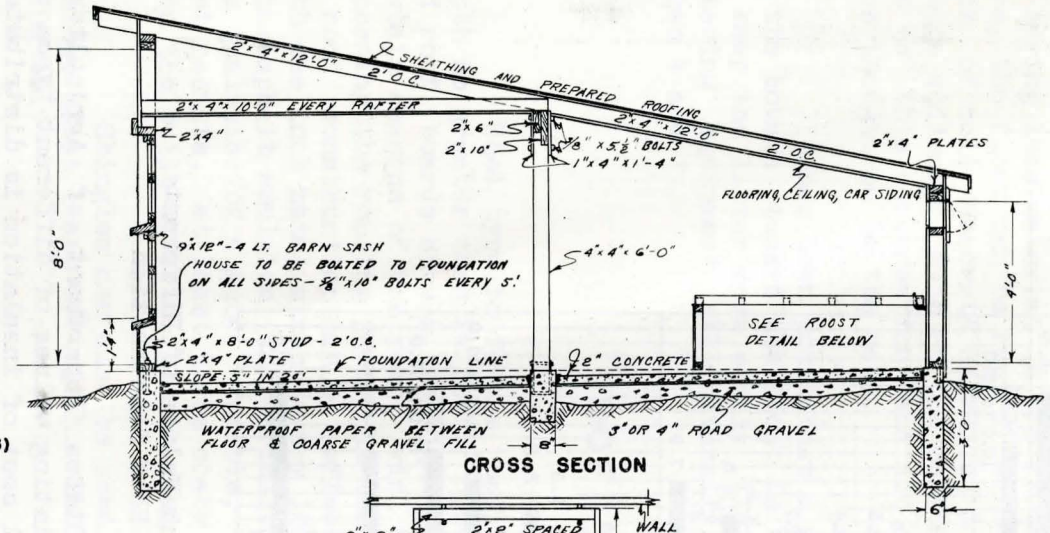
FRONT ELEVATION



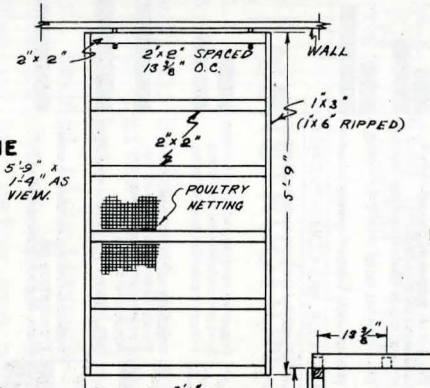
REAR ELEVATION



SIDE ELEVATION

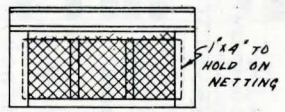


CROSS SECTION

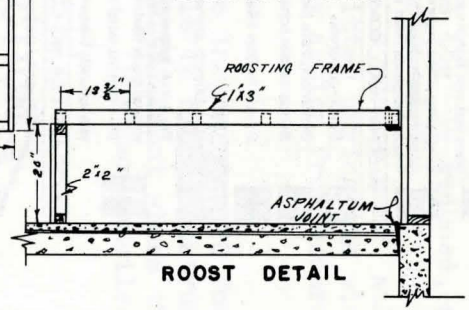


ROOSTING FRAME

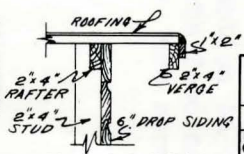
NOTE: MAKE SEVEN 5'-9" x 3'-1" & ONE 5'-9" x 1'-4" AS SHOWN IN PLAN VIEW.



FRONT OF DROPPING FRAME



ROOST DETAIL



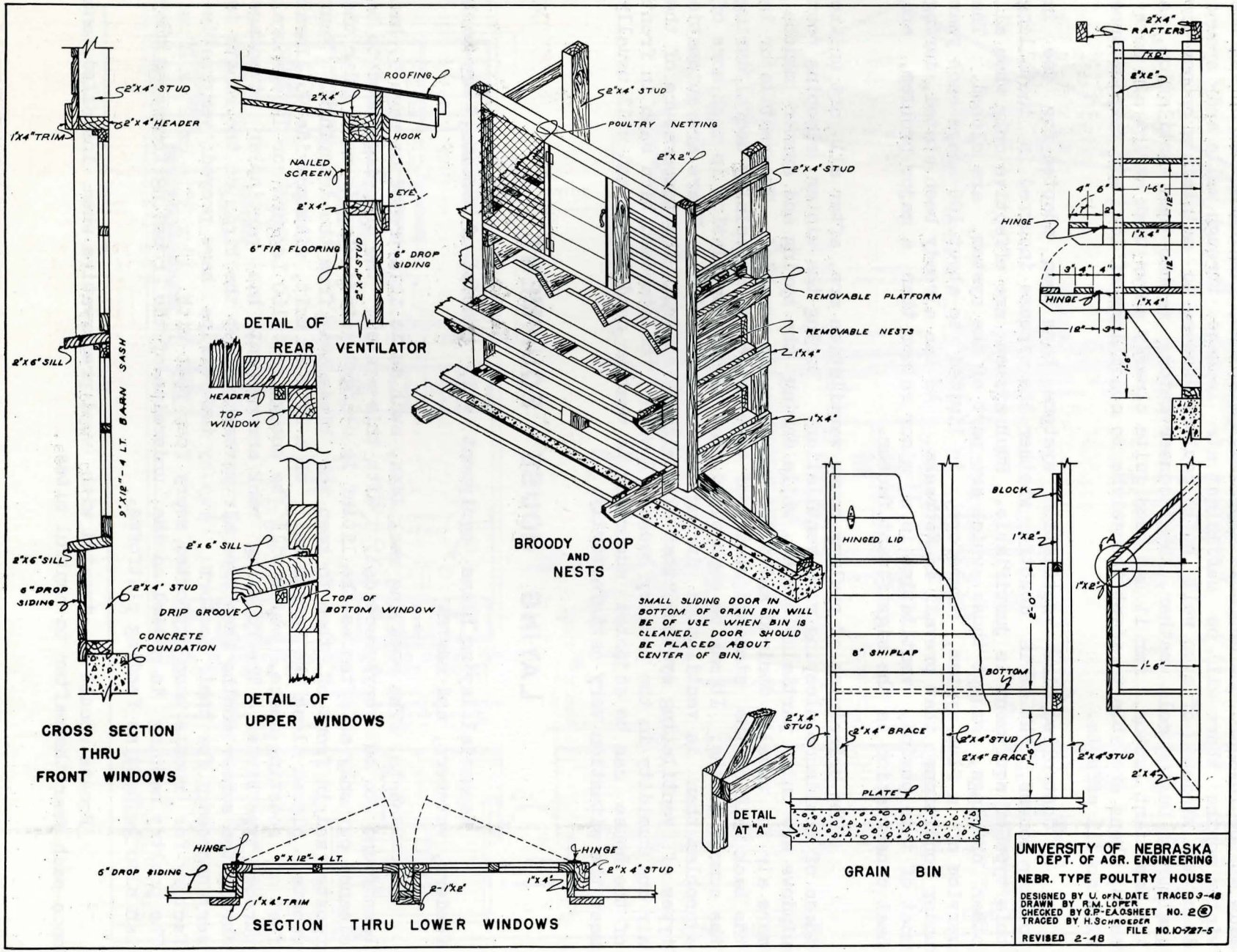
DETAIL OF EAVES

UNIVERSITY OF NEBRASKA
DEPT. OF AGRICULTURAL ENGINEERING

NEBR. TYPE POULTRY HOUSE

DESIGNED BY U. OF N. TRACED 9-'48
CHECKED BY E.A.O. & G.P.
DRAWN BY R.M.L.
TRACED BY H.S. SHEET 1 OF 2

REVISED 9-'48 FILE NO. 10-727-5



UNIVERSITY OF NEBRASKA
DEPT. OF AGR. ENGINEERING

NEBR. TYPE POULTRY HOUSE

DESIGNED BY U. of N. DATE TRACED 3-48
DRAWN BY R.M. LOPER
CHECKED BY G.P.-E.A.O. SHEET NO. 2 ②
TRACED BY H. SCHROEDER
FILE NO. 10-727-5
REVISED 2-48

VENTILATION

As a management problem, poultry house ventilation has provoked much speculation, but until recently little real investigation. Some observations, made at the Iowa and the Nebraska Experiment Stations, indicate that during the winter months there will be sufficient air leakage through walls and around doors and windows of even well built poultry houses to maintain a proper air quality. During cold weather, heat conservation, rather than ventilation, is the important factor, for it has been quite clearly shown that at low air movements, hens are able to adapt themselves to conditions of low air temperatures with no ill effects.

Controlled flue ventilation systems have been adapted for use in poultry houses, but it is doubtful whether the expense incurred in installing this type of equipment is justifiable. Such systems are effective only when all other openings, except those which are part of the system, are closed. The service of a flue system, therefore, is limited to about 100 days each year under conditions that prevail in Nebraska. As has already been stated, during most of this period, ventilation is a minor rather than a major problem, and heat conservation is the significant factor.

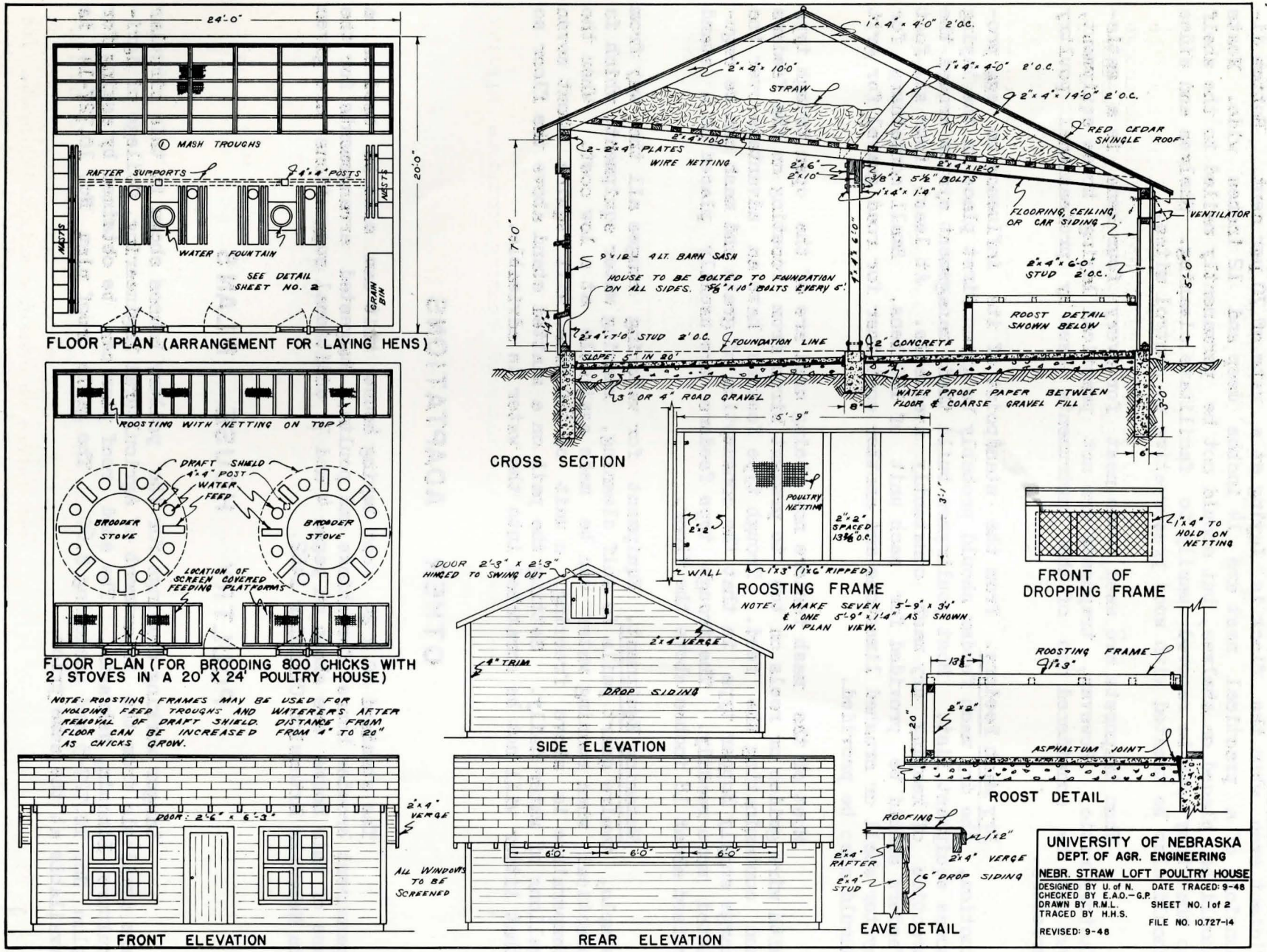
The principles of poultry house ventilation are, after all, not unlike those of residence sleeping room ventilation. During the winter, sleeping room windows are only partially opened, while during the spring and summer months, more air is usually desired and wider openings are provided. The ventilator in the back wall of the standard shed roof type house is especially useful during the summer months. It may be emphasized that summer ventilation is much more of a problem than is ventilation during the winter months. There are automatic types of ventilating systems that electrically control the temperature of the air and humidity in the poultry house. However, the standard barn sash in front of the house can be adjusted according to weather conditions, and will usually meet the situation very satisfactorily.

LAYING HOUSE EQUIPMENT

Essential laying house equipment will consist of roosts, dry mash feeders, waterers, and nests.

Roosts. The roosting rack idea, such as is illustrated on page 5, has been found to be very practical. With this system, the droppings need to be cleaned out only as often as the litter is changed, since wire is used under the roosts and in front of them to keep the birds away from the droppings. Four roosts, placed along the north wall of a 20 x 24 unit, will provide 96 lineal feet of roosting space, which will be enough for 160 Leghorn or 145 general purpose type birds. The roosting rack arrangement has particular advantage during the summer months when free air movement about the birds on the roosts is very necessary for their comfort. Two by two strips have proved very satisfactory for roosts when supported every four feet with 1" x 3" s or 2" x 2" s. The poultry netting is nailed on the underside of the roosting frames so they can also be used as feeding platforms.

Roosts should be treated with wood preservative when installed, and once each year thereafter to control mites.


24'-0"
20'-0"
① MASH TROUGHS
RAFTER SUPPORTS
4"x4" POSTS
WATER FOUNTAIN
SEE DETAIL SHEET NO. 2
GRAIN BIN
FLOOR PLAN (ARRANGEMENT FOR LAYING HENS)
ROOSTING WITH NETTING ON TOP
DRAFT SHIELD
4"x4" POST
WATER
FEED
BROODER STOVE
BROODER STOVE
LOCATION OF SCREEN COVERED FEEDING PLATFORMS
FLOOR PLAN (FOR BROODING 800 CHICKS WITH 2 STOVES IN A 20' X 24' POULTRY HOUSE)
NOTE: ROOSTING FRAMES MAY BE USED FOR HOLDING FEED TROUGHS AND WATERERS AFTER REMOVAL OF DRAFT SHIELD. DISTANCE FROM FLOOR CAN BE INCREASED FROM 4" TO 20" AS CHICKS GROW.
DOOR: 2'-6" x 6'-3"
2"x4" VERGE
ALL WINDOWS TO BE SCREENED
FRONT ELEVATION
1"x4"x4'-0" 2'O.C.
2"x4"x10'0"
STRAW
2"x4"x14'-0" 2'O.C.
RED CEDAR SHINGLE ROOF
2-2"x4" PLATES
WIRE NETTING
2"x6" 2"x10"
2"x4"x12'-0"
3/8" x 5½" BOLTS
1"x4"x1'4"
FLOORING, CEILING, OR CAR SIDING
VENTILATOR
7'-0"
9'x12' 4 LT. BARN SASH
HOUSE TO BE BOLTED TO FOUNDATION ON ALL SIDES. 5/8" A.10' BOLTS EVERY 5'.
2"x4"x6'-0" STUD 2'O.C.
ROOST DETAIL SHOWN BELOW
2"x4"x7'10" STUD 2'O.C.
FOUNDATION LINE
2" CONCRETE
SLOPE 5" IN 20'
3" OR 4" ROAD GRAVEL
WATER PROOF PAPER BETWEEN FLOOR & COARSE GRAVEL FILL
CROSS SECTION
5'-9"
3'-1"
POULTRY NETTING
2"x2"
2"x2" SPACED 13⅜" O.C.
WALL
1"x3" (1"x6" RIPPED)
ROOSTING FRAME
NOTE: MAKE SEVEN 5'-9" x 34" & ONE 5'-9" x 1'4" AS SHOWN IN PLAN VIEW.
1"x4" TO HOLD ON NETTING
FRONT OF DROPPING FRAME
DOOR 2'-3" x 2'-3" HINGED TO SWING OUT
2"x4" VERGE
4" TRIM
DROP SIDING
SIDE ELEVATION
6'-0"
6'-0"
6'-0"
REAR ELEVATION
13⅜"
ROOSTING FRAME 9"x3"
2"x2"
20"
ASPHALTUM JOINT
ROOST DETAIL
ROOFING
1"x2"
2"x4" RAFTER
2"x4" STUD
2"x4" VERGE
6" DROP SIDING
EAVE DETAIL
UNIVERSITY OF NEBRASKA
DEPT. OF AGR. ENGINEERING
NEBR. STRAW LOFT POULTRY HOUSE
DESIGNED BY U. of N. DATE TRACED: 9-48
CHECKED BY E.A.O.-G.P.
DRAWN BY R.M.L. SHEET NO. 1 of 2
TRACED BY H.H.S. FILE NO. 10.727-14
REVISED: 9-48

Nests. Twenty-eight nests for each unit of 160 hens will be sufficient even when the flock is laying at a rate of 70 per cent. Bottom dimensions of a practical nest are 14 inches deep and 12 inches wide. Nests should be placed on shelves, but should not be permanently nailed to the shelf so that they can be removed easily to facilitate cleaning. Shelves and sides should also be treated with wood preservative to control mites.

When trapnests are used, one nest for every four hens is a satisfactory ratio. However, trapnests are not practical laying house equipment, but must be considered one of the instruments used by professional poultry breeders.

Dry Mash Feeders. From the standpoint of its influence on egg production, the dry mash feeder should probably be given first place in the laying house equipment list. Most poultrymen build their management system around the practice of keeping dry mash constantly available. At least four six foot feeders should be provided for each unit of 160 hens. Small containers for oyster shell or crushed limestone and another container for road gravel for grit should also be provided.

Most of the mash feeders now being used are of the open trough type with wire guides or reels on top to prevent birds from roosting on the feeders and contaminating the feed. Trough type feeders have an advantage over the large supply hopper type in that the consumption of grain and mash can be regulated more readily. The trough type feeders are usually placed on a stand raised about 18 inches above the floor.

Watering Equipment. Equipment for watering ranges all the way from simple, twelve quart pails to self cleaning, running water equipment, which is practical when running water can be made available at a low cost. When the temperature is above freezing, a unit of 160 hens will require about seven gallons of water daily. Setting the pail on a slatted stand above the floor so that litter will not be scratched into the water is advisable.

OTHER ADAPTATIONS

The standard 20 x 24 foot laying house unit can also be used as a permanent brooder house for chicks and poults. Suggested arrangements for the use of this house are shown on pages 4 and 7, additional suggestions are given in Nebraska Extension Circular 1462.

POULTRY HOUSE PLANS

Larger working drawings for the poultry houses shown in this circular are available from the Department of Agricultural Engineering, College of Agriculture, Lincoln, Nebraska. The shed roof plan can be obtained by asking for plan No. 10.727-5 and enclosing $.60. The gable roof plan No. 10.727-14 is available at the same price.